

OCT 28 1966

Sanitized - Approved For Release CIA-RDP75-00149R000100790007-1

CHINA TEST SHOWS ENGINEERING GAIN

U.S. Expert Estimates the
Program Took 10 Years

By STUART H. LOORY

It probably took ten years of work by the best Chinese scientists and engineers to make possible the Peking Government's test yesterday of a missile with a nuclear warhead, according to a leading American rocket designer.

The designer called the test in Sinkiang "an advanced dress rehearsal" for an operational weapons system.

He pointed out a nuclear warhead required the use of scientific brains, but relatively little engineering skill.

A rocket, however, requires a high degree of engineering competence to solve all the organizational problems of bringing thousands of men and tens of thousands of components together on a tight schedule and fitting them together in a workable vehicle. The scientific principles behind this problem were solved years ago.

Developed on Secrecy

Development of the Chinese missile has proceeded with great secrecy. The major milestones in the development of the warhead part of the program have been announced only because, with modern methods of surveillance, they are detectable abroad. The rockets could be developed more quietly until the time for flight testing came.

Ironically, the Chinese received great aid from both of their great enemies of today—the Soviet Union and the United States. The Soviet made its contributions openly during a period when the two Communist powers were closely allied.

They sent scientists and technicians to China who, it is believed, greatly aided the Chinese in developing both an atomic energy program and a guided missile program before the two countries began to go separate ways in the late nineteen fifties.

Contribution by U. S.

The United States contribution was not voluntary. In 1955, Dr. Tsien Hsue-shen, a leading aeronautical engineer and important contributor to the American rocket program, left this country and went to China, where he is believed to be in charge of the Chinese missile program.

While the engineers worked quietly behind the scenes, the fruits of the atomic scientists' work exploded on the world dramatically on Oct. 16, 1964, with the announcement that the Chinese had detonated their

first atomic device at the Lop Nor testing site.

Aerial samples of the radioactivity that shot produced stunned Western analysts. It showed the Chinese were serious about their entry into the nuclear era, using enriched uranium 235, and not plutonium, for their bombs.

Use of enriched uranium allows the Chinese to produce enough material for a substantial number of warheads every year.

'Device' of 1965

The second test came on May 14, 1965, and was still called a "device," as distinct from a weapon, but analysts say this distinction for atomic bombs is not as important as it was in the early 1950's in describing primitive hydrogen weapons.

The third test came last May 9 and contained "thermonuclear materials." It showed American analysts that the Chinese were capable of building big hydrogen bombs of an advanced type.

While the scientists were getting their publicity, the engineers continued with the tedious job of assembling components ranging from big, high-pressure fuels tanks and complex pumps to little washers.

It takes tens of thousands of such parts to make modern rockets and they all have to be brought together in a process known in the aerospace business as "systems engineering." It is a monumental organizational job that the Chinese have apparently mastered.

Yesterday's test marked a milestone. Now organization is needed to train the men to operate the missiles and to develop the command and control procedures that will make sure they only work when needed.

A short-range system—one that would threaten Taiwan and China's other immediate neighbors, might take only a year or two, experts said.

A longer range system would take longer—maybe as long as 10 years.

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